



**Math Department  
Annual Unit Plan for Academic Year 2014-15  
Planning Year 2013**

**STEP I: DESCRIBE YOUR DEPARTMENT/UNIT**

**a. Department Mission/Connection to College Mission**

The Mathematics Department at Cerro Coso Community College plays an important role in preparing students to achieve their educational goals. We offer math courses from the remedial level to transfer level as well as an online math degree. Our curriculum supports the mathematical needs of other disciplines and programs. We help our students develop logical reasoning and problem solving skills which form a foundation for their careers and future study. The Mathematics Department at Cerro Coso Community College offers classes which improve basic skills and support the requirement for the AA and AS degrees, vocational/technical programs, and transfer to the university. We have entered into agreements and developed equivalencies with the California State Universities (CSU) and University of California (UC) systems. When our students transfer to the CSU or UC system, credits they earn in the mathematics department are transferable. This is also an indication that these transfer students from Cerro Coso Community College will be successful in completing higher degrees. The Mathematics Department offers courses at the Indian Wells Valley (IWV), Kern River Valley (KRV), Eastern Sierra College Center (ESCC), South Kern (SK), as well as Online. Four full-time faculty serve the IWV campus. One full-time faculty serves the KRV campus, and one full-time faculty serves the ESCC campus. Courses offered at SK are taught by adjunct faculty. Courses are also taught online.

**b. Partnerships**

The Cerro Coso Community College Mathematics Department maintains an ongoing partnership with Antelope Valley College, and the Department of Engineering at the California State University, Long Beach.



### c. Special Initiatives for Student Engagement

The Math Department Faculty has a department website which makes our department and what we do visible on the internet. As a department, we could advertise our online math degree more than we do currently. We could also attract more students by communicating with one or more local high schools about course alignment, student placement, teaching strategies and bridge pathways during the summer.

To increase student engagement in the classroom, instructors use strategies such as peer group work to give students at all skill levels a role in the classroom, project based learning, and reflective journal writing about lessons in class as well as class presentations. As a department we will discuss our ideas among instructors and reflect on what works well and what does not.

## STEP 2: REVIEW PROGRESS AND PLAN FUTURE STRATEGIES

### a. Progress Made on Program Review

The Math Department will be completing a Math AA Degree Program Review in 2015. There will also be a Liberal Arts Degree Program Review to be completed in January of 2014 that involves courses in the math department. Over the past 3 years the math department has made the improvements and implemented the strategies below:

- an accelerated Math C020/C040 class which has been piloted for two semesters.
- a general awareness among instructors to standardize student learning outcomes in syllabuses and include “SLOs” that pertain to instruction of learning and self- efficacy skills.
- designed improvements listed below for SLOs that were under the target of 70% during the last review.



**b. Progress Made on Outcome Assessment. *If more lines are needed, place cursor in the bottom right box, press [Tab].***

Semester Assessed	SLO/AUO	Target Missed/Gap Detected	Brief Summarization of Improvements Designed	When Reassessed
Fall 2012	<b>Math 20</b> solve problems involving decimals using the operations of addition, subtraction, multiplication and division.	69% / 1%	Checking answers as to whether or not they are reasonable in the context of the original problem.	Spring 2014
Fall 2012	<b>Math 20</b> convert numbers between decimals, fractions and percents and employ this skill to solve applications	67% / 3%	Require an 80% or higher on a practice exam	Spring 2014
Fall 2012	<b>Math 20 and 40</b> Employ learning and self -efficacy skills	No assessment	Implement an across the board assessment	Spring 2014
Fall 2012	<b>Math 40</b> Add, subtract, and multiply polynomials and be able to evaluate algebraic expressions	65% / 5%	Typically polynomials are introduced at the end of the course and the topic may be presented in a rushed manner or not at all. Integrate polynomials in other parts of the course and present the topic early on in the course.	Spring 2014
Fall 2012	<b>Math 40</b> apply basic graphing techniques.	68% / 2%	Graphing in two dimensions entails but one section of the math 40 text. Spend more time on this essential skill.	Spring 2014

Spring 2012	<b>Math 50</b> perform operations with polynomials, including factoring	62% / 8%	Emphasize the definitions and mathematical properties involving algebraic terms	Fall 2014
Spring 2012	<b>Math 50</b> graph equations and inequalities in one and two dimensions, including applying the concept of slope.	61% / 9%	Emphasize the algebraic and graphical connection involved with 2- coordinate points and lines in the Cartesian Coordinate System.	Fall 2014
Spring 2012	<b>Math 50</b> translate between English phrases and sentences and mathematical expressions and equations to solve applications.	65% / 5%	<p>1. Emphasize that grasping a word problem's meaning is a multi-stage process.</p> <p>a. Emphasize that certain English words can be directly translated into a mathematical symbol or operation, for example, is means =, and or increase means +, from or decrease means -, of means ×, per means ÷.</p> <p>b. Skim over the problem.</p> <p>c. Re-read the problem slowly.</p> <p>d. Draw a picture of the described situation.</p> <p>e. Assign each variable a relevant meaning, for example, "Let x be the number of feet across the river".</p> <p>f. Make a table of variables and their values, if applicable</p>	Fall 2014
Spring 2012	<b>Math 55</b> recognize the difference between functions and non-functions	59% / 11%	Point out that when comparing input and output tables to determine which represents a function, only the ones that have a repeated domain value will contain more than one output for a given input and therefore will not be functions. Relate this to the vertical line test.	Fall 2014

Spring 2012	<b>Math 55</b> graph a line and write the equation of a line.	65% / 5%	Graphing a minimum of 3 points will help detect sign and algebraic errors when graphing ordered pairs. Putting equations in slope-intercept form will allow students to check graphs with rise over run as well as develop equation writing skills.	Fall 2014
Spring 2012	<b>Math 55</b> recognize and graph a parabola or circle or ellipse.	59% / 11%	Emphasize transformations from the parent function $y=x^2$ in the graphing of quadratics.	Fall 2014
Spring 2012	<b>Math 55</b> set up and solve word problems related to the skills above.	67% / 3%	<ol style="list-style-type: none"> <li>1. Point out the similarities of the word problems between the different chapters in this course. For example many of the word problems involving one variable are set up with a table in the exact same manner as a problem involving two variables. When the students see that they have done this before, the process will be familiar.</li> <li>2. Point out the similarities in the tables used for various types of problems. For example mixture, motion, interest problems all have a rate column.</li> <li>3. In motion problems emphasize recognizing what is the "key" to the given situation. Are the distances, times or rates additive, are they the same etc.?</li> </ol>	Fall 2014
Spring 2012	<b>Math 121</b> have a basic literacy in the areas of probability and statistics.	58% / 12 %	Emphasize applications over theory. As an example, here is the commentary from one instructor. I did purchase a Roulette wheel and we play roulette for a while discussing strategies, probabilities, and expected winnings. I also have a lottery machine that I use in class; a good place to discuss the difference between 0 and 0+ probabilities. I also use cards and a variety of dice; e.g., I recently purchase some spherical dice that	Fall 2014

			gives new meaning to "rolling the dice." Gizmos that help attract attention for those with a short attention span.	
Spring 2012	<b>Math 121</b> follow and evaluate a statistical line of reasoning.	60 % / 10 %	Encourage students to "draw the picture" and shade in the appropriate area to help reinforce the concept and help associate the visual to the number they are getting. I have a normal curve template and show this to students as a means to encourage them to draw helpful pictures & diagrams.	Fall 2014
Spring 2012	<b>Math 121</b> choose and apply appropriate statistical techniques to real world data problems	51 % / 19%	Have students work applications collaboratively in class following a step by step procedure. Each group is given an application where they discuss and decide on the null/alternative hypotheses, test statistic, p-value and conclusion. One group representative then records on the board in front of the class. Hopefully the repetition will reinforce the procedure for hypothesis testing	Fall 2014
Spring 2012	<b>Math 130</b> develop mathematical models and employ linear curve fitting techniques.	52% / 18%	Present a "big picture" explanation using a scatter diagram with several lines drawn through it, and ask which line best fits the points in the diagram.	Fall 2015

Spring 2012	<b>Math 130</b> to use both geometric and simplex methods of linear programming to solve optimization problems with two or more variables.	59% / 11%	Here's another one where pictures help. Tie together the concepts of evaluating the objective function at corner points with the Simplex Method process. Demonstrate that the first process occurs in two dimensions, whereas the second occurs in at least two.	Fall 2015
Spring 2012	<b>Math 130</b> summarize and analyze data sets and apply statistical models to them.	63% / 7%	Instruct students in how to conduct non-linear regression using either their graphing calculators, (I recommend that they obtain either a TI83 or TI84) or Excel.	Fall 2015
Spring 2012	<b>Math 131</b> Take derivatives of functions and apply these derivatives to business problems.	68% / 2%	No department discussion	Spring 2015
Spring 2012	<b>Math 131</b> Find the maximum and minimum in more than two variables by the second derivative test and LaGrange Multipliers	65% / 5%	No department discussion	Spring 2015
Spring 2012	<b>Math 141</b> . Recognize the equations of exponential functions and logarithmic functions, describe their graphs	62% / 8%	No department discussion	Spring 2014

	and use their properties algebraically and via calculator methods.			
Spring 2012	<b>Math 142</b> Analyze trigonometric functions and their graphs using the concepts of amplitude, period, phase and vertical shifts and apply these ideas to real-world problems.	69% / 1%	No department discussion	Spring 2015
Spring 2012	<b>Math 142</b> Analyze trigonometric equations to determine what combination of algebra and identities will lead to a solution.	66% / 4%	No department discussion	Spring 2015
Spring 2012	<b>Math 142</b> . Apply trigonometry to operations with complex numbers.	67% / 3%	No department discussion	Spring 2015
Spring 2012	<b>Math 151</b> Apply the derivative in solving related rates problems	69% / 1%	No department discussion	Fall 2015



Spring 2012	<b>Math 151</b> Apply the integral in finding the center of mass in one and two dimensions.	67% /3%	No department discussion	Fall 2015
Spring 2012	<b>Math 152</b> No assessment data			Spring 2015
Spring 2012	<b>Math 251</b> Use vector-valued functions to describe motion in space.	58% / 12%	No department discussion	Fall 2015
Spring 2012	<b>Math 255</b> Define and identify differential equations, distinguishing between forms and methods of solution (separable, exact, linear, substitution, and modeling).	52.5% / 17.5%	No department discussion	Spring 2014
Spring 2012	<b>Math 255</b> Perform computations and graphical interpretations using computational and mathematical software.	52 % / 18%	No department discussion	Spring 2014



Spring 2012	<b><u>Math 257</u></b>  <b>No outcomes below 70%</b>			Fall 2014
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**c. Progress Made on Department/Unit Strategies**

Since the last assessment no data review has occurred that I am aware of even though many of the improvements in design have been implemented in several courses. In the case of Math 121 where the achievement gaps below 70% are among the largest, the SLO's have been revised to be more specific to match the SLO's in the C-IDs which are skills that we are already teaching anyway. By stating the skill more specifically, we can nail down a more specific remediation.

**d. Department/Unit Strategies for Next Academic Year.**

***Strategy 1: Implement Supplemental Instruction In Some Basic Skills Math Courses***

- 1. Objective 1.1** Increase the percentage of students who successfully complete 12 units within one year using 2011-12 as the baseline year.
2. Implement supplemental instructors ( SI's) in some of the Basic Skills Math Courses (Math 20 and 40). Give an SLO assessment exam at the end of all Math 20 and 40 classes. The SLO assessment results are then compared with Basic Skills Math Courses without SI intervention in order to observe trends.
3. While this strategy does not address the topic of finishing 12 units of math faster in the same sense that say an accelerated math class would, it could in fact have an indirect effect on the success rate of the goal. Through the use of an SI, students develop a peer group with good study habits, sound basic math skills and a guided and collaborative effort to stay focused on the math sequence. As an example, with a better experience in a regular Basic Skills Math Course, a student will be more likely to enroll and be successful in a subsequent summer class thereby allowing the student the opportunity to complete 12 units in one year.



4. The expected completion date is Fall 2015.  
5. Steve Rogers  
6. Which of the following is **primarily** true of this strategy? Choose one.

- It is designed to improve internal unit operations  
 It is designed to increase student success

7. If the strategy is designed to increase student success, which of the following areas of the student experience does it address? Choose as many as apply.

- Intake       Remediation       First Year       2nd Year/Program Completion       Post-Graduation

**Strategy 2: All Instructors Provide 3 Hours Per Week of One-to-One or Small Group Math Tutoring in the LAC**

1. **Objective 1.2** Increase the percentage of students who, within a one-year period, successfully complete Math courses both one level below transfer and at the transfer level using 2011-12 as the baseline year.  
2. The idea is to facilitate the procedure for a student going to an instructor's office for help by changing to a location that is more accessible for the student. This will require that all of the full-time math instructors make themselves available in the LAC on a weekly basis to all students at the college who need help in any math courses through the transfer level.  
3. The success of this strategy can be measured by following a 3-year cohort group and looking for an upward trend in transfer level enrollments as well as transfer level completions at Cerro Coso College. Data of this type are already being collected so no new process needs to be implemented.  
4. The expected completion date is Fall 2015  
5. Steve Rogers  
6. Which of the following is **primarily** true of this strategy? Choose one.

- It is designed to improve internal unit operations  
 It is designed to increase student success

7. If the strategy is designed to increase student success, which of the following areas of the student experience does it address? Choose as many as apply.

- Intake       Remediation       First Year       2nd Year/Program Completion       Post-Graduation



**STEP 3: SUBSTANTIATE REQUESTED RESOURCES (Note: All items must be prioritized.)**

a. **1000 Category.** Please indicate below any requests for temporary or new permanent certificated positions. (Do not request adjunct instructors for normal teaching assignments as this is captured in the Academic Affairs division plan.) *If more lines are needed, place cursor in the bottom right box and press [Tab].*

Description	Location	Priority: 1 = high 2 = med 3 = low	Strategic Plan goal addressed by this resource	If a full-time faculty member is being requested, use the box below. Use this space to provide a detailed rationale for temporary certificated positions only. The rationale should refer to your unit's mission and goals, recent program review or SLO assessment gaps, planning assumptions, and/or the College's strategic plan.	Estimated amount of funding requested (temporary positions only)	Will this be one-time or on-going funding?	Funding Source (check <u>one</u> ): G = General Fund, O = Other	
							G	O
None								

**Full-Time Faculty Staffing Justification:**

1. Are there too few or too many students enrolling for particular classes or majors?
2. Are there too many courses or programs that are under capacity?
3. Are courses "core mission"?
4. Are courses overscheduled?
5. Is there capacity to offer courses or programs at different times and/or locations?



6. Is there a workforce shortage in the service area or region?
7. What are the costs and/or lost revenue from gaps between student demand and course or program capacity?
8. In support of your proposal, provide the following data:
  - a. Size of wait lists in the discipline
  - b. Department productivity, previous year
  - c. Number of faculty currently in the department
  - d. Number of adjunct faculty
  - e. Number of certificates awarded, previous year
  - f. Number of degrees awarded, previous year
  - g. Core curriculum classes
  - h. CTE classes with workforce data (wage/high demand)
  - i. Number of students at first day and census, previous year

**b. 2000 Category. Please indicate below any requests for temporary or new permanent classified staff. Include labor amounts only; benefits will be calculated separately. *If more lines are needed, place cursor in the bottom right box and press [Tab].***

Position Title	Location	Priority: 1 = high 2 = med 3 = low	Strategic Plan goal addressed by this position	Salary Grade	Number of Months	Number of Hours per Week	Salary Amount	Funding Source (check <u>one</u> ): G = General Fund, O = Other  G      O	
None									



**Classified Staffing Justification. If more than one position requested, copy and paste additional boxes.**

1. Describe how the position is linked to your unit's mission and goals, recent Program Review or SLO assessment gaps, planning assumptions, and/or the College's strategic plan.
2. Explain why the work of this position cannot be assigned to current staff.
3. Describe the impact on the college if the position is not filled.

**c. 4000 Category. Use the space below to itemize and explain budget requests in the category of supplies and equipment. If more lines are needed, place cursor in the bottom right box and press [Tab].**

Describe resource requested	Location	Priority: 1 = high 2 = med 3 = low	Strategic Plan goal addressed by this resource	Provide a detailed rationale for the requested resource. The rationale should refer to your unit's mission and goals, recent Program Review or SLO assessment gaps, planning assumptions, and/or the College's Strategic Plan	Estimated amount of funding requested	Will this be one-time or on-going funding?	Funding Source (check <u>one</u> ): G = General Fund, O = Other	
							G	O
None								

**d. 5000 Category. Use the space below to itemize and explain budget requests in the category of service, utilities, and operating expenses. If more lines are needed, place cursor in the bottom right box and press [Tab].**



Describe resource requested	Location	Priority: 1 = high 2 = med 3 = low	Strategic Plan goal addressed by this resource	Provide a detailed rationale for the requested resource. The rationale should refer to your unit's mission and goals, recent Program Review or SLO assessment gaps, planning assumptions, and/or the College's Strategic Plan	Estimated amount of funding requested	Will this be one-time or on-going funding?	Funding Source (check <u>one</u> ): G = General Fund, O = Other  G      O	
None								

**e. 6000 Category.** Use the space below to itemize and explain budget requests in the category of capital outlay. *If more lines are needed, place cursor in the bottom right box and press [Tab].*

Describe resource requested	Location	Priority: 1 = high 2 = med 3 = low	Strategic Plan goal addressed by this resource	Provide a detailed rationale for the requested resource. The rationale should refer to your unit's mission and goals, recent Program Review or SLO assessment gaps, planning assumptions, and/or the College's Strategic Plan	Estimated amount of funding requested	Will this be one-time or on-going funding?	Funding Source (check <u>one</u> ): G = General Fund, O = Other  G      O	
None								

[insert unit/department name here]



**STEP 4: ATTACH COMPLETED BUDGET WORKSHEET (provided separately)**